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What is claimed:

1. A spinal spacer comprising a load bearing member having a wall sized for engagement within a space between adjacent vertebrae to maintain the space, said load bearing member including a bone graft impregnated with an effective amount of an osteogenic composition to stimulate osteoinduction, said osteogenic composition including a substantially pure osteogenic factor in a pharmaceutically acceptable carrier.
2. The spacer of claim 1 wherein said osteogenic factor is a purified bone morphogenic protein isolated from bone.
3. The spacer of claim 1 wherein said osteogenic factor protein is a recombinant human protein.
4. The spacer of claim 3 wherein said bone morphogenic protein is selected from the group consisting of BMP-1, BMP-2, BMP-3, BMP-4, BMP-5, BMP-6, BMP-7, BMP-8, BMP-9, BMP-10, BMP-11, BMP-12, BMP-13, a mixture thereof and a heterodimer thereof.
5. The spacer of claim 4 wherein said bone morphogenic protein is rhBMP-2, rhBMP-7 or a mixture or heterodimer thereof.
6. The spacer of claim 1 wherein said carrier is physiological saline.
7. The spacer of claim 1 wherein said carrier is buffered sterile water.

8. The spacer of claim 1 wherein said member is a cylindrical bone dowel having a diameter larger than the height of the space between the adjacent vertebrae.

9. The spacer of claim 8 wherein said bone member defines a chamber and said bone graft is a bone dowel obtained from the diaphysis of a long bone having a medullary canal, said chamber including a portion of said canal.

10. The spacer of claim 9 further comprising an effective amount of a second osteogenic composition to stimulate osteoinduction, said second composition packed within said chamber.

11. The spacer of claim 10 wherein said second composition has a length which is greater than a length of said chamber and said second composition is disposed within said chamber to contact the endplates of adjacent vertebrae when the graft is implanted between the vertebrae.

12. The spacer of claim 11 wherein said second osteogenic composition is selected from the group consisting of autograft, allograft, demineralized bone, calcium phosphate ceramics, and an osteoinductive factor disposed within a pharmaceutically acceptable matrix.

13. The spacer of claim 1 wherein said member includes an anterior wall and said anterior wall defines a tool engaging hole for receiving an implanting tool.

14. The spacer of claim 1 wherein said member includes at least two opposite bone engaging surfaces for contacting a corresponding one of the adjacent vertebrae when the spacer is implanted therebetween, at least one of said engaging surfaces defining surface roughenings.

21. The spacer of claim 18 wherein said threads define an angle between leading and trailing flanks of adjacent ones of said teeth, said angle between about 50 degrees and 70 degrees.

22. The spacer of claim 18 wherein each said tooth has a height between about 0.030 inches and about 0.045 inches.

23. The spacer of claim 18 wherein said dowel includes a tool engaging portion defining a tool engaging hole for receiving an implanting tool.

24. The spacer of claim 23 wherein said tool engaging hole is threaded to receive a threaded implanting tool.

25. A spinal spacer comprising a load bearing member having a wall sized for engagement within a space between adjacent vertebrae to maintain the space, said load bearing member defining a chamber and including a bone graft obtained from the diaphysis of a long bone having a medullary canal said chamber including a portion of the canal, and an effective amount of an osteogenic composition to stimulate osteoinduction, said composition including a substantially pure osteogenic factor in a pharmaceutically acceptable matrix and packed within said chamber.

26. The spacer of claim 25 wherein said composition has a length which is greater than a length of said chamber and said composition is disposed within said chamber to contact the endplates of adjacent vertebrae when the spacer is implanted between the vertebrae.

27. The spacer of claim 26 wherein said osteogenic factor is a purified bone morphogenic protein isolated from bone.

28. The spacer of claim 26 wherein said osteogenic factor is a recombinant human bone morphogenic protein.

29. The spacer of claim 28 wherein said osteoinductive factor is a bone morphogenic protein and said protein is selected from the group consisting of BMP-1, BMP-2, BMP-3, BMP-4, BMP-5, BMP-6, BMP-7, BMP-8, BMP-9, BMP-10, BMP-11, BMP-12, BMP-13, a mixture thereof and a heterodimer thereof.

30. The spacer of claim 29 wherein said bone morphogenic protein is rhBMP-2, rhBMP-7 or a mixture or heterodimer thereof.

31. The spacer of claim 30 wherein said matrix is selected from the group consisting of calcium sulphates, polylactic acids, polyanhydrides, collagen, calcium phosphates and polymeric acrylic esters.

32. The spacer of claim 31 wherein said matrix includes a bioceramic.

33. The spacer of claim 32 wherein said bioceramic is a calcium phosphate ceramic.

34. The spacer of claim 33 wherein said ceramic is a biphasic calcium phosphate ceramic, including hydroxyapatite and tricalcium phosphate.

35. The spacer of claim 34 wherein the ratio of hydroxyapatite to tricalcium phosphate is between about 0:100 and about 65:35.

36. The spacer of claim 25 wherein said bone dowel includes an outer surface and said outer surface defines a tool engaging hole for receiving an implanting tool.

37. The spacer of claim 25 wherein said member is a bone dowel having an outer surface defining threads, said threads being uniformly machined threads, said threads including teeth each having a crest between a leading flank and an opposite trailing flank.

38. The spacer of claim 37 wherein said crest of each said tooth is flat, having a width of between about 0.020 inches and about 0.030 inches.

39. The spacer of claim 38 wherein said threads define an angle between leading and trailing flanks of adjacent ones of ... said teeth, said angle between about 50 degrees and 70 degrees.

40. The spacer of claim 38 wherein each said tooth has a height between about 0.030 inches and about 0.045 inches.

41. The spacer of claim 37 wherein said dowel includes a tool engaging portion defining a tool engaging hole for receiving an implanting tool.

42. The spacer of claim 41 wherein said tool engaging hole is threaded to receive a threaded implanting tool.

43. The spacer of claim 25 wherein said graft is a cortical ring obtained by a cross-sectional slice of the diaphysis, said ring including superior and inferior surfaces and said osteogenic factor is a bone morphogenic protein.

44. The spacer of claim 43 wherein said protein is selected from the group consisting of BMP-1, BMP-2, BMP-3, BMP-4, BMP-5, BMP-6, BMP-7, BMP-8, BMP-9, BMP-10, BMP-11, BMP-12, BMP-13, a mixture thereof and a heterodimer thereof.

45. The spacer of claim 44 wherein said bone morphogenic protein is rhBMP-2, rhBMP-7 or a mixture or heterodimer thereof.

46. The spacer of claim 43 wherein said matrix is selected from the group consisting of calcium sulphates, polylactic acids, polyanhydrides, collagen, calcium phosphates and polymeric acrylic esters.

47. The spacer of claim 46 wherein said matrix includes a biphasic calcium phosphate ceramic, including hydroxyapatite and tricalcium phosphate.

48. The spacer of claim 43 wherein said ring includes an outer surface adjacent and between said superior and inferior surfaces and said outer surface defines a tool engaging hole for receiving an implanting tool.

49. The spacer of claim 43 wherein at least one of said superior and inferior surfaces are roughened.

50. The spacer of claim 43 wherein at least one of said superior and inferior surfaces includes teeth.

51. The spacer of claim 43 wherein at least one of said superior and inferior surfaces defines a waffle pattern.

52. The spacer of claim 37 wherein said load bearing member has a compressive strength of at least 10,000 N.

53. The spacer of claim 52 wherein said load bearing member has a compressive strength of at least 20,000 N.

54. The spacer of claim 37 wherein said load bearing member has a fatigue strength of at least 3200 N at five million cycles.

55. The spacer of claim 54 wherein said load bearing member has a fatigue strength of at least 7000 N at five million cycles.

56. A hollow spinal spacer for engagement between vertebrae, comprising:

- an anterior wall having a convexly curved anterior surface... and opposite ends;

- a posterior wall having a flat posterior surface and opposite ends;

- two lateral walls, each integrally connected between said opposite ends of said anterior and posterior walls to define a chamber; and

- said walls comprised of bone and further defining;

- a superior face defining a first opening, said opening in communication with said chamber, said superior face having a superior engaging surface; and

- an opposite inferior face defining a second opening, said second opening in communication with said chamber, said inferior face having an inferior engaging surface.



57. The spacer of claim 56 wherein said bone is cortical bone obtained from the diaphysis of a long bone having a medullary canal, said chamber including a portion of the medullary canal.

58. The spacer of claim 56, further comprising an effective amount of an osteogenic composition to stimulate osteogenesis, said composition disposed within said chamber.

59. The spacer of claim 56 wherein said osteogenic composition includes a material selected from the group consisting of autograft, allograft, a bioceramic and a substantially pure osteogenic factor in a pharmaceutically acceptable matrix.

60. The spacer of claim 59 wherein said bioceramic is a biphasic calcium phosphate ceramic.

61. The spacer of claim 59 wherein said factor includes a bone morphogenic protein selected from the group consisting of BMP-1, BMP-2, BMP-3, BMP-4, BMP-5, BMP-6, BMP-7, BMP-8, BMP-9, BMP-10, BMP-11, BMP-12 and BMP-13, a mixture thereof and a heterodimer thereof.

62. The spacer of claim 61 wherein said matrix is selected from the group consisting of calcium sulphates, polylactic acids, polyanhydrides, collagen, calcium phosphates and polymeric acrylic esters.

63. The spacer of claim 56 wherein said anterior wall defines a tool engaging hole for receiving an implanting tool.

64. The spacer of claim 63 wherein said tool engaging hole is threaded for receiving a threaded implanting tool.

65. The spacer of claim 56 wherein at least one of said engaging surfaces are roughened.

66. The spacer of claim 56 wherein at least one of said engaging surfaces includes teeth.

67. The spacer of claim 56 wherein at least one of said engaging surfaces defines a waffle pattern.

68. The spacer of claim 56 further comprising a blade on at least one of said engaging surfaces.

69. The spacer of claim 1 wherein said graft is porous and said composition is contained within said pores.

70. The spacer of claim 1 wherein said wall defines a bone growth thru-hole therethrough, said thru-hole sized to receive mesenchymal cells.

71. The spacer of claim 25 wherein said wall defines a bone growth thru-hole therethrough, said thru-hole communicating with said chamber and sized to receive mesenchymal cells.

72. The spacer of claim 56 wherein said wall defines a bone growth thru-hole therethrough, said thru-hole communicating with said chamber and sized to receive mesenchymal cells.